

HARVEST INDEX AND YIELD PARAMETERS IN FOXTAIL MILLET (*SETARIA ITALICA* (L.) BEAUV)

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In the present study an attempt was made to understand the nature of relationships among yield parameters and their association with grain yield and relative contribution of each of these parameters to the final built up of grain yield in 39 foxtail millet.

The experimental material for the present study comprised 39 diverse cultivars of foxtail millet raised in randomized block design with three replications during kharif 1987 with 22.5 x 10 cm spacing. The observations were recorded on five random plants within the middle 5 rows of 9-row plots in each replication. Genotypic and phenotypic correlations [1] and path coefficient analysis [2, 3] were worked out.

Grain yield showed highly significant and positive genotypic correlation with total tillers, effective tillers, test weight, harvest index (H. I.) and biological yield (Table 1). Test weight and harvest index were related with each other positively and significantly. Though earlier workers [4, 5] identified harvest index as the most important component in finger millet, detailed analysis has not been carried out. In the present study, path analysis (Table 2) revealed the importance of harvest index and biological yield as the major determinants of grain yield, as they contributed maximum direct and indirect effects towards grain yield/plant. Since these two parameters are easy to measure, they can serve as selection criteria in isolating superior genotypes even in early segregating generations. Such trends were observed earlier in foxtail millet [6–8]. Further the association of short stature with high grain yield can lead to the development of ideal plant type in this crop.

Table 1. Genotypic (G) and phenotypic (P) correlation coefficients in foxtail millet

Character	Tillers total	effective	Days flowering	Days maturity	Flag leaf area	Ear length	Bristle length	Sink volume	Wt. of main ear	Test wt.	Protein (%)	H.I.	Bio. yield	Yield per plant
Plant height	G	-0.81**	0.65**	0.54**	0.15	0.47**	-0.29	0.31	0.07	-0.25	-0.00	-0.42**	-0.39*	-0.63**
	P	-0.70**	0.58**	0.49**	0.11	0.46**	-0.26	0.30	0.20	-0.15	0.02	-0.22	-0.17	-0.27
Total tillers	G	1.00**	-0.56**	-0.30	-0.46**	-0.68**	0.49**	-0.68**	-0.46**	0.24	0.07	0.27	0.28	0.51**
	P	0.99**	-0.49**	-0.26	-0.34*	-0.50**	0.43**	-0.44**	-0.32**	0.13	0.06	0.16	0.22	0.37**
Effective tillers	G		-0.57**	0.30	-0.50**	-0.69**	0.49*	-0.69**	-0.45**	0.26	0.10	0.27	0.30	0.52**
	P		-0.49**	-0.26	-0.37*	-0.51**	0.42**	-0.44**	-0.31*	0.14	0.07	0.16	0.25	-0.38*
Days to flowering	G		0.82**	0.29	0.82**	0.25	-0.03	-0.07	-0.16	-0.25	0.11	-0.73**	-0.15	-0.93**
	P		0.82**	0.24	0.82**	0.19	-0.03	-0.06	-0.12	-0.22	0.11	-0.53**	-0.09	-0.51**
Days to maturity	G				0.09	0.13	0.24	-0.29	-0.33*	-0.18	0.20	-0.75**	-0.19	-0.86**
	P				0.07	0.10	0.23	-0.21	-0.25	-0.15	0.20	-0.55**	-0.13	-0.48**
Flag leaf area	G				0.55**	0.55**	-0.20	0.64**	0.45**	-0.24	-0.13	-0.10	-0.03	-0.12
	P				0.30	0.30	-0.19	0.35*	0.23	-0.21	-0.11	-0.09	-0.10	-0.13
Ear length	G				-0.20	0.90**	-0.20	0.90**	0.76**	-0.33*	-0.01	-0.33*	-0.05	-0.21
	P				-0.11	0.71**	-0.11	0.71**	0.64**	-0.20	0.03	-0.07	0.13	0.17
Bristle length	G					-0.45**	-0.28	-0.45**	-0.28	-0.07	0.16	-0.29	0.04	-0.04
	P					-0.27	-0.17	-0.27	-0.17	-0.05	0.15	-0.19	0.07	0.02
Sink volume	G					0.81**	0.81**	0.81**	0.81**	-0.05	-0.13	0.01	0.06	0.18
	P					0.78**	0.78**	0.78**	0.78**	-0.02	-0.08	0.23	0.22	0.36*
Weight of main ear	G					-0.09	-0.09	-0.09	-0.09	-0.09	-0.04	0.04	0.29	0.29
	P					-0.03	-0.03	-0.03	-0.03	-0.03	-0.01	0.26	0.31	0.32*
Test weight	G					0.04	0.04	0.04	0.04	0.04	0.04	0.42**	0.04	0.46**
	P					0.04	0.04	0.04	0.04	0.04	0.04	0.28	0.03	0.20
Protein percentage	G					-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	0.22	-0.06
	P					-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	0.17	-0.04
Harvest index	G					0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.83**
	P					0.63**	0.63**	0.63**	0.63**	0.63**	0.63**	0.63**	0.63**	0.63**
Biological yield	G					-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	0.44**
	P					0.39*	0.39*	0.39*	0.39*	0.39*	0.39*	0.39*	0.39*	0.39*

** Significant at 5% and 1% levels, respectively.

Table 2. Direct and indirect effects of yield components on grain yield at genotypic level

Character	Plant height	Total tillers	Effective tillers	Days to flowering	Days to maturity	Flag leaf area	Ear length	Bristles length	Sink volume	Weight of main ear	Test weight	Protein per cent	Harvest index	Biological yield	Total correlation
Plant height	0.37	-0.03	-0.15	-0.08	0.06	-0.00	0.36	-0.11	0.00	-0.03	-0.02	0.00	-0.62	-0.40	-0.63**
Total tillers	-0.30	0.03	0.18	0.07	-0.03	0.00	-0.53	0.18	-0.01	0.22	0.02	-0.01	0.40	0.29	0.51**
Effective tillers	-0.30	0.03	0.18	0.07	-0.03	0.00	-0.53	0.18	-0.01	0.21	0.02	-0.01	0.41	0.31	0.52**
Days to flowering	0.24	-0.02	-0.10	-0.12	0.09	-0.00	0.19	-0.01	-0.00	0.08	-0.02	-0.01	-1.09	-0.16	-0.93**
Days to maturity	0.20	-0.01	-0.05	-0.10	0.11	-0.00	0.10	0.09	-0.00	0.16	-0.01	-0.02	-1.12	-0.19	-0.86**
Flag leaf area	0.06	-0.02	-0.09	-0.04	0.01	-0.01	0.42	-0.08	0.01	-0.21	-0.02	0.01	-0.15	-0.03	-0.12
Ear length	0.18	-0.02	-0.12	-0.03	0.01	-0.01	0.77	-0.07	0.01	-0.36	-0.02	0.00	-0.49	-0.06	-0.21
Bristles length	-0.11	0.02	0.09	0.00	0.03	0.00	-0.15	0.37	-0.00	-0.13	-0.01	-0.01	-0.43	0.04	-0.04
Sink volume	0.12	-0.02	-0.12	0.01	-0.03	-0.01	0.69	-0.17	0.01	-0.38	-0.00	0.01	0.02	0.06	0.18
Weight of main ear	0.03	-0.02	-0.08	0.02	-0.04	-0.00	0.59	-0.10	0.01	-0.47	-0.01	0.00	0.06	0.30	0.29
Test weight	-0.09	0.01	0.05	0.03	-0.02	0.00	-0.26	-0.03	-0.00	-0.04	0.07	-0.00	0.62	0.04	0.46**
Protein per cent	-0.00	0.00	0.02	-0.01	0.02	0.00	-0.01	0.06	-0.00	0.02	0.00	-0.09	-0.30	0.23	-0.06
Harvest index	-0.16	0.01	0.05	0.09	-0.08	0.00	-0.25	-0.11	0.00	-0.02	0.03	0.02	1.485	-0.23	0.83**
Biological yield	-0.14	0.01	0.05	0.02	-0.02	0.00	-0.04	0.02	0.00	-0.13	0.00	-0.02	-0.34	1.03	0.44**

** Significant at 5% and 1% levels, respectively.

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